can never be renewed. On all grounds the creation of such a bureau as has been advocated by the Committee is to be heartily welcomed by the mining community, and it ought to play a leading part in co-ordinating the utilisation of our mineral resources after the war to the best advantage.

It is doubtful whether other recommendations are likely to be quite so successful in every case, and in some instances they scarcely appear to have been sufficiently thought out. Thus one of the suggestions is the creation of a statutory tribunal to enforce the granting of wayleaves where unreasonably withheld. There is no doubt that wayleaves do in many cases press unduly and unfairly upon the mineral producer, but the proper remedy is a modification of the whole system rather than a palliative to be applied only to cases where wayleaves are refused. At present any landowner is at liberty to make whatever charge he thinks fit for a mineral wayleave across his land, and his method is to base his charges upon the presumed needs of the miner. A simple legislative enactment that the measure of a wayleave rental should be, not the necessity of the miner, but the amount of damage suffered by the landowner, is really what is required. There would be no difficulty in finding a tribunal capable of properly assessing such damage, and it cannot be fairly urged that such a system would be inequitable. Again, whilst the Committee has devoted some attention to the question of taxation, it has failed to note how unfairly the present methods press upon the mineral industry, inasmuch as in levying income-tax no regard is given to the fact that a mine or a mineral property is necessarily a wasting asset, and that what is, in fact, to-day taxed as profit derived from the working of minerals is not all profit, but represents as to a portion of it a return of the capital invested. The only recommendation made on the very important matter of allowances for depreciation for income-tax purposes is that it should be "on an adequate scale"; the Committee does not appear to recognise that the principle of calculating depreciation upon the diminishing value of machinery and plant is wrong, and that the entire subject needs revision in the light of modern industrial methods.

As regards the supplies of ores, both of the ferrous and non-ferrous metals, the present report does not advance in any way upon the reports of the respective Departmental Committees, except in so far as they would receive much valuable assistance from the Imperial bureau of mineral resources. It need scarcely be said that the report contains a vast amount of valuable information, and will well repay attentive perusal; nevertheless, the special aspect of the whole subject, to which attention is here devoted—namely, the future development of the mineral resources of the Empire—has not received the share of consideration to which its pre-eminent importance entitles it. This was, perhaps, inevitable, having regard to the constitution of the Committee and the wide range of its inquiries; but it is none the less to be regretted.

H. Louis.

NOTES.

The long list of honours announced on Monday, for war and other services, in celebration of the King's birthday, includes the names of the following workers in scientific fields:—*G.C.V.O.:* Sir Alfred Keogh. *K.C.M.G.:* Sir William Leishman, F.R.S. *K.C.S.I.:* Sir Thomas Holland, F.R.S. *C.I.E.:* Lt.-Col. E. A. R. Newman, Indian Medical Service, superintendent, Medical School, Dacca, Bengal; Mr. J. R. Henderson, superintendent, Government Museum; Mr. C. A. Barber, Agricultural Service, Imperial sugar-cane expert, Madras. *K.C.B.:* Surg.-Gen. H. D. Rolleston. *C.B.:* Sir Hugh Bell, Bart. *K.C.M.G.:* Prof. John Cadman. *C.M.G.:* Prof. H. L. Ferguson, professor of ophthamology, University of Otago. *Knights:* Mr. Harry Baldwin, for services as dental surgeon to his Majesty for a number of years, and as head of the Kennington Facial Hospital; Mr. C. H. Burge, late departmental principal of the Government Laboratory; Mr. Mayo Robson, past vice-president of the Royal College of Surgeons; and Dr. E. D. Ross, principal of the School of Oriental Studies.

The British Science Guild is organising a comprehensive exhibition of products and appliances of scientific and industrial interest which prior to the war were obtained chiefly from enemy countries but are now produced in the United Kingdom. His Majesty the King has graciously consented to become patron of the exhibition, and the Marquess of Crewe, K.G., is president. Among the vice-presidents are the Prime Minister; Mr. Winston Churchill, Minister of Munitions; Sir Albert Stanley, President of the Board of Trade; Mr. H. A. L. Fisher, President of the Board of Education; Dr. Addison, Minister of Reconstruction; Lord Moulton; Lord Rayleigh; Lord Sydenham; Sir J. J. Thomson, president of the Royal Society; Sir Norman Lockyer, and Sir William Mather. The exhibition, which will be held at King's College from about the first week in August until the first week in September, will show, in the first place, products chiefly imported from Germany before the war, but now made in this country; and it will also illustrate the remarkable developments that have taken place generally in our scientific industries. In many of these, as a matter of fact, Great Britain always excelled, and it is only our national quality of self-depreciation which has prevented the public from appreciating the fact that we were able to export to Germany apparatus and products embodying the highest scientific knowledge and technical skill. The general scope of the exhibition has been set forth in a preliminary leaflet which has been issued, from which it is noted that the exhibits will include chemical products, thermal, electrical, and optical appliances, glass, quartz, and refractory material, photographic apparatus and material, surgical and medical appliances, and papers and textile products. It is believed that the exhibition will have a most stimulating influence upon scientific and industrial research, and the exhibits, with the demonstrations and lectures that will be given in order to explain them, will undoubtedly bring home to manufacturers, as well as to the general public, the great and growing part that science plays in industry. Further particulars may be obtained from the Organising Secretary, 82 Victoria Street, London, S.W.1.

The King and Queen gave a small dinner-party at Buckingham Palace on Tuesday night, at which the guests included Sir Joseph Thomson, president of the Royal Society, and Lady Thomson, and Sir Frederic Kenyon, president of the British Academy, and Lady Kenyon.

THE Geological Society of France has awarded this year's Gaudry medal to Prof. H. F. Osborn, of the American Museum of Natural History.

THE family of the late Dr. George J. Hinde has presented to the Geological Department of the British Museum (Natural History) his collection of fossils, with numerous microscopic preparations illustrating his researches on radiolaria, sponges, and other small organisms. Most of the fossils were collected by Dr. Hinde himself from the Palæozoic formations of Canada, the United States, and Sweden.

THE Wilbur Wright memorial lecture of the Aeronautical Society will be delivered in the Central Hall, Westminster, on Tuesday, June 25, at 8 o'clock, by Prof. W. F. Durand, chairman of the American Advisory Committee for Aeronautics, Scientific Attaché to the American Aviation Mission in Europe, and professor of mechanical engineering, Stanford University, U.S.A. The subject will be "Some Outstanding Problems in Aeronautics."

THE second reading of the Coinage (Decimal System) Bill was moved by Lord Southwark in the House of Lords on Tuesday, June 4. Lord Leverhulme opposed the motion, though he was not against the principle of decimal coinage. He objected to making the sovereign the unit and dividing it into one thousand parts, and he thought that a British decimal system of coinage should be based upon the halfpenny. After discussion, the debate was adjourned on the understanding that the Government will institute an inquiry into the whole question of decimal coinage, including the proposals contained in Lord Southwark's Bill.

WE learn from *Science* that Dr. Ferdinand Braun, who shared the Nobel prize in 1909 with Mr. Marconi for distinguished achievements in the invention of improved methods of wireless telegraphy, died on April 14 at a Brooklyn hospital. Dr. Braun was born in Fulda, Germany, in 1850, and was professor of physics in the University of Strassburg, when he went to the United States in 1914 as a witness in litigation between the Marconi Wireless Co. and the German company which built and operated the wireless station at Sayville, L. I.

A MYSTERIOUS epidemic has made its appearance in Madrid, and is stated already to have claimed more than 100,000 victims. In offices, factories, and schools some 30 to 40 per cent. of the inmates have been attacked, and all classes of the community are affected. The disease commences suddenly with severe headache, followed by high fever, throat irritation, some bronchitis, muscular and joint pains, gastric disturbance, and depression and debility; these symptoms last for three to four days, and then convalescence commences. At first the disease was quite benign, but now is fatal to a certain proportion of debilitated subjects. According to a correspondent of the *Times*, there were more than 700 fatal cases in the ten days ending June 2. The disease in many respects resembles influenza, but the influenza bacillus has not been found. A meningococcus-like microbe, termed a para-meningococcus, has been isolated.

THE Inter-Allied Scientific Food Commission, which has met in Paris and Rome, is now holding a meeting in London. The Commission consists of two scientific delegates from each of the four countries—America, England, France, and Italy—and one from Belgium. The object of the Commission is to consider all questions affecting the supply of food to the various Allied countries, in agreement with the Allied Food Executives (which determine the division of food among the Allies), and to make what recommendations it thinks advisable to the respective Governments. At the first two meetings certain physiological principles were established, such as the amount of food necessary for each man, and, as a result, the amount of food necessary for each country. The question with which the Commission is now concerned is the making of a census of the production of foodstuffs in each country. The members of the Commission will attend the meeting of the Royal Society to be held to-day, when it is hoped that as many fellows as possible will be present to meet them.

THE Food Investigation Board of the Department of Scientific and Industrial Research has appointed a committee to inquire into the present methods of freezing, storing, and preserving fish, and to conduct experiments directed towards the improvement of existing methods. The constitution of the committee is as follows:—Mr. H. G. Maurice (chairman), Board of Agriculture and Fisheries; Prof. W. M. Bayliss, professor of physiology, University of London; Prof. J. Stanley Gardiner, professor of zoology, Cambridge; Mr. Crawford Heron, Swansea; Prof. F. Gowland Hopkins, professor of biochemistry, Cambridge; Mr. W. J. Howard, Ministry of Food; Mr. Douglas Johnstone, Ministry of Food; Staff Paymaster Jones, Fishery Board for Scotland; Prof. J. C. McLennan, professor of physics, University of Toronto; Prof. G. H. F. Nuttall, Quick professor biology, Cambridge; Sir Thomas Robinson, Grimsby; ex-Provost Malcolm Smith, Fishery Board for Scotland; Mr. J. M. Tabor, Peninsular House, E.C.3; Mr. H. J. Ward, Dartford Iron Works, Kent; and Mr. E. Warner, National Fish, Poultry, Game, and Rabbit Association, Leicester, with Capt. L. H. James as secretary. All communications intended for the committee should be addressed to the Secretary, Fish Preservation Committee, at 43 Parliament Street, London, S.W.1.

THE sixteenth annual meeting of the South African Association for the Advancement of Science will be held in Johannesburg on July 8–13, under the presidency of Dr. C. F. Juritz. The presidents of the sectional committees will be as follows:—Section A, Astronomy, Mathematics, Physics, Meteorology, Geodesy, Surveying, Engineering, Architecture, and Irrigation: Prof. J. T. Morrison. Section B, Chemistry, Geology, Metallurgy, Mineralogy, and Geography: Dr. P. A. Wagner. Section C, Botany, Bacteriology, Agriculture, and Forestry: Mr. C. E. Legat. Section D, Zoology, Physiology, Hygiene, and Sanitary Science: Prof. E. J. Goddard. Section E, Anthropology, Ethnology, Native Education, Philology, and Native Sociology: Rev. W. A. Norton. Section F, Education, History, Mental Science, Political Economy, General Sociology, and Statistics: Prof. T. M. Forsyth.

As is well known, German dirigibles are equipped with wireless, but there has always been a certain amount of speculation as to how the scarcely perceptible signals can be heard in the midst of the noise due to the motors and the displacement of the air. According to a German technical publication (quoted in *La Nature*, May 25), a special method is in use. The high-frequency oscillations of the receiving station act on an Einthoven galvanometer. The plant recalls the prismatic sight. Underneath is a small electric lamp, the light of which falls on a narrow slit, ordinarily covered by the galvanometer string. The string is in an intense magnetic field. When the receiving current passes, the string deviates, thus allowing the luminous ray to be perceived. The observer at the sighting device can thus read the signals transmitted, in dots and dashes, in the form of short or long light-rays projected by the illuminated slit.

THE Leeds automatic telephone exchange, which was opened on May 18, is the largest automatic exchange in Europe. Sir William Slingo, the head engineer of the Post Office, was one of the first to recognise that the manual operators in an exchange will ultimately have to be replaced by automatic devices. The longer the development is delayed, the more capital will be lost when the manual exchanges have to be scrapped. The Post Office has been criticised for carrying on the work in war-time, but the need was urgent, and, besides, the manual instruments displaced at Leeds were most useful for war service at the front. The Leeds exchange is equipped for 6800 subscribers, but it will ultimately have a capacity for 15,000. It represents the very latest developments in automatic working. A storage battery in the exchange supplies the energy required for the working of all the switches. The definite and accurate working of all the necessary switches when any subscriber takes his telephone off the hook and operates his dial is perfect. When the "called" subscriber is engaged the "busy back" signal is sent automatically, and the subscriber has to wait before he calls again. As there are 26,000 wires entering the building, the arrangement of all the connections is a marvel of ingenuity. The Post Office has several other automatic exchanges in this country. The next largest is at Portsmouth, which has 5000 subscribers already connected and an ultimate capacity of 7000.

IN a recent letter to the *Times* (May 27) the Duke of Montrose pleads for moderation in the destruction of rooks. His lordship has examined thirty gizzards of birds shot between April 1 and May 31, twenty of which contained worms and grubs, six had grains of oats and other matter, one beetles and worms, and one horse-manure and grit. The fallacy, however, of judging of a bird's feeding habits by examining the food content of the stomach during certain periods of the year has frequently been dwelt upon, and just as in this case it would lead the uninitiated to pronounce a verdict in its favour, in regard to other species it would lead us to condemn undoubtedly beneficial species. Whilst not wishing to see the rook exterminated, experience shows that it certainly requires reducing in numbers. An investigation, now extending over four years, on the food of the rook, during which period upwards of 2000 birds have been examined, shows that of the total food eaten in a year, 35·1 per cent. consists of cereals, 13·4 of potatoes and roots, 6·1 of miscellaneous vegetable matter, 4·4 of weed seeds, 23·9 of injurious insects, 3·5 of beneficial insects, 4·6 of neutral insects, 3·2 of slugs and snails, 4·4 of earthworms, and 1·4 of eggs, mice, etc. In other words, 52 per cent. of the rook's food is injurious, 19·5 neutral, and 28·5 beneficial. It is, therefore, impossible to ignore the fact that at present this bird does considerably more harm than good, and that there is now overwhelming evidence to this effect which it would be foolish for the farmer to ignore.

SPRING has closed with a burst of brilliantly fine weather, and May almost throughout maintained its usual characteristic of fickleness. The first half of the month was cooler and the rainfall was generally heavier than in the latter part of the month. At the commencement of May the cold was greatest in Scotland, the weekly weather report, ending May 4, showing the deficiency of temperature to be 4° F. in Scotland E.; at Greenwich the deficiency was only 1·4°. For the week ending May 11 the temperature was not very different from the normal in any part of the British Isles, and at Greenwich there was an excess of 1·6° F. For the week ending May 18 temperature had an excess of 5·3° at Greenwich, and for the week ending May 25 an excess of 6·2°. The highest temperature at Greenwich was 83° on May 21, whilst at Camden Square the thermometer registered 88°, and at Tulse Hill 87°. At the latter station the mean temperature for May was 58°, the mean maximum was 68°, and the mean minimum 48°. The mean maximum temperature for May 1 to 15 was 62°, and the mean maximum for May 16 to 31 74°, whilst the mean minimum was respectively 46° and 51°. Temperature this year in May is nearly as high as last year, and is about 4° above the normal. An absolute maximum of 83° has frequently been beaten for May at Greenwich, but there has been no record as high as 88°.

WE have received from the Rev. S. Graham Brade-Birks descriptions of a curious cloud effect which he has observed over Darwen Moor, Lancashire, the point of observation being in the town of Darwen, to the east of the moor. The effect consisted of a thin stratum of cloud which appeared to run parallel to the contour of the hill of the moor for a considerable distance from south to north. The cloud was noticed on two separate occasions, viz. on May 6, at 9.30 p.m., and on May 17, at 10·15 p.m., summer time. On the first occasion the sky was otherwise cloudless; on the second the stratum of cloud was superimposed upon a background of cumulo-nimbus cloud, in the western sky, from which rain afterwards fell. On both occasions there was a light N.W. or W.N.W. wind at the surface at 10 p.m., summer time, which had succeeded a light or moderate S.S.E. wind at 10 a.m. The weather-maps for the two occasions present some points of similarity. On May 6 Darwen was situated in the col or "saddle" between two "highs" and two "lows"; on May 17 it was in the corner of a north-easterly extension of an anticyclone—that is, just on the high side of a "saddle." In such circumstances pilot-balloon observations have frequently revealed the existence of two distinct currents of air superimposed one upon the other, one current conforming with one of the barometric systems, and the other with the system on the opposite side of the place of observation. The sequence of wind observations at the surface would support such a view for these occasions. The bounding plane between the two currents would be a region where stratus clouds, due to mixing of moist air of different temperatures, would be liable to form. There may be some feature of the Darwen Moor which would locally facilitate such a process.

AT the suggestion of the Palestine Exploration Fund, an organising committee has been constituted by the British Academy with the object of founding a British School of Archæology at Jerusalem. The committee, in a memorandum just issued, points out that while American, French, and German schools of archæology existed in Jerusalem before the war, this country possessed no such institution. It is proposed to establish a school to be devoted, both by excavation and surveying, to the furtherance of Palestinian archæology in all its branches. In addition to Hebrew and Jewish sites and antiquities, the school would include within its scope the Canaanite, Græco-Roman, Byzantine, Arab, and Medieval periods. An essential part of the scheme is that the school should be not only an excavating body, but also a training school for archæologists. It is hoped that universities, colleges, other institutions, and private patrons will provide a number of annual scholarships of 100*l*. each. The organising committee invites contributions towards an endowment fund, which has been started with gifts of 1000*l*. each from Mr. Walter Morrison and Mr. Robert Mond. It is hoped that a minimum of 20,000*l*. will be raised. Mr. Robert Mond will act as treasurer of the fund, and contributions should be made payable to him, crossed "a/c British School of Archæology at Jerusalem." All communications should be addressed to the honorary secretary, Prof. I. Gollancz, British Academy, Burlington House, Piccadilly, W.

EARLY in 1914 Mr. J. Reid Moir began to make a detailed study of two ancient levels formerly occupied by man, now buried in a brickfield near Ipswich. He has just completed the work, which is the most exhaustive research of the kind hitherto undertaken in this country, and the results are published in the last part of the Journal of the Royal Anthropological Institute (vol. xlvii.). With the aid of several specialists, whose reports are included, Mr. Moir deals with the subject from every point of view. The flint implements are illustrated in many beautiful drawings by Mr. E. T. Lingwood, those of the lower level being clearly late Mousterian, while those of the upper level are Aurignacian. Two specimens found in the hill-wash overlying the upper level are Solutrean, and an arrowhead from the surface soil is Neolithic. These implements were examined by the late Prof. V. Commont, who noted that they represented the same succession of types as he had discovered in the loams and alluvium of Northern France and Belgium. Some fragments of human bones found on the lower level are considered by Prof. Keith to be essentially identical with those of modern man. Some pieces of pottery from the same level are also interesting.

THIRTY-FIVE years ago a committee of the British Association compiled a table to represent the average heights and weights of British children at each year of growth. Experience has shown that the standards laid down by the committee are not satisfactory. In recent numbers of *School Hygiene* (December, 1917, April, 1918) Major James Kerr seeks to lay down what may be described as an ideal British standard. He assumes that the average Briton, if reared under healthy conditions, should reach the height of 1·770 m. (5 ft. 10 in.), some two inches above our present average. "By selection of the children to be measured, excluding the deformed and diseased, the backward mentally, and starved, ill-clothed, and city-dwarfed children, it should be possible to lay down standards for height considerably above the measurements at present considered satisfactory." Indeed, the standards laid down by Major Kerr are considerably above the measurements yielded by the best samples of British children. We believe that such an ideal standard will not prove satisfactory, because the admission or rejection of children considered healthy will depend on the individual judgment of the medical officer concerned. Nevertheless, Major Kerr's papers form a valuable contribution towards the solution of a difficult problem.

IN association with the article in our issue of May 16 on "The Co-ordination of Scientific Publication," it is of interest to note that at the Congress of Archæological Societies held in November last Mr. H. St. George Gray pointed out the desirability of more co-ordination in the exchange of archæological publications so as to secure for each society a full record of published work. The difficulty in completing sets of Proceedings arose generally from the fact that most societies had their scarce volumes due, amongst other causes, to the publication of important contributions of more than local interest, which led to an abnormal demand on the number of copies printed. As a result, odd volumes required to complete library sets had to be sought in second-hand book lists, as the cost of reprinting scarce issues was usually prohibitive. Special publications, volumes issued for members only, and loose-leaf publications were often omitted from exchanges, and in the absence of carefully compiled indices important contributions were often either overlooked or seriously delayed. Adequate index volumes are of especial value in archæological publications, and should be issued and exchanged by all societies concerned with the subject. An additional consideration arose from the fact that indices were often published as extra volumes, and were not included in exchanges. Although the value of exchanges between societies was regarded from the scientific rather than from the commercial point of view, any difficulties connected with special issues of this character should be capable of equitable adjustment by proportional payments.

LITTLE is yet known in regard to the reproductive organs of the Cetacea. A paper on this subject, which appears in the *Journal of Anatomy*, vol. iii., part 2, by Prof. Meek is therefore welcome. Prof. Meek deals with the modifications these organs present in relation to function rather than with their general disposition. Both sexes of the common porpoise (*Phocaena communis*) and the male organs of the white-beaked dolphin (*Lagenorhynchus albirostris*) are described at length, and some valuable notes on the male organs of other species of Delphinidæ and on the remarkable spermathecal recess of female Cetacea are also given.

THE March issue of the *American Museum Journal* (vol. xvii., No. 3) contains among several admirably illustrated articles one by Mr. D. B. Macmillan on "The Food Supply of the Smith Sound Eskimo." After surveying the abundant food supplies during the polar summer, Mr. Macmillan shows how the Eskimo, who is perforce entirely carnivorous, consumes about 1000 lb. of meat a year, about half of which is eaten raw and frozen. A high proportion of this generous diet is consumed during summer and autumn. Winter is often a period of want. Mr. Macmillan points out that probably already the war has affected the well-being of these far northern people. For many years they had depended on Danish trading ships not only for tobacco, matches, thread, needles, etc., but, more important, for firearms, knives, steel traps, and other implements of the chase. The non-arrival of the trading ship in 1917 forced the Eskimo largely to fall back on the hunting methods of a century ago—to bone arrows, ivory harpoon-shafts, flint knives, and so forth. Another year of these conditions, Mr. Macmillan believes, will result in so great a falling off in food supplies that the tribe will dwindle to a pitiful few.

M. LEROY described before the Société des Experts Chimistes de France recently a new process of examining eggs by photography. The opacity of the shell is got over by using intense illumination, a luminous objective, extra-sensitive plates, and other suitable devices. M. Leroy uses a graduated transparent scale, which is reproduced photographically at the same time as the egg. The method described has the advantage over the "shadow" method that it reproduces the internal condition of the egg. The eggs are tested in the way that steel rails, shells, etc., are—*i.e.* by selecting a certain percentage for test from each batch.

DR. L. DE LAUNAY, in the issue of *La Nature* for May 18, describes the efforts of a French company to cultivate the eucalyptus and pine on a large scale in the Peñarroya district of Spain (on the borders of Córdoba and Ciudad Real) for the production of paper-pulp. At first the geological conditions of this region were not considered favourable for intensive afforestation, but experiment showed that the two woods mentioned would yield satisfactory results under proper treatment. The results are justifying expectations, and it is hoped that the once barren region will in a few years repay the time and money spent in developing it. The wood will be used for pulping, pit-props (there are mines near), and for the distillation of acetic acid, etc.

FROM a copy we have received of Prof. Righi's paper on the ionisation produced by X-rays in a magnetic field, which appeared recently in the *Annales de Physique*, it is evident that the presence of a magnetic field has an influence on the process of ionisation of gas molecules not taken into account in previous descriptions of the process. If two horizontal plates are maintained at a difference of potential in a rarefied gas through which X-rays are passing, and the electric current between the plates is measured, we get the well-known relation between the current and the applied potential. If a horizontal magnetic field is superposed on the electric field between the plates, we should expect the deflection of the electrons produced by the field to diminish the current between the plates. This Righi finds to be the case for fields of 1000 gauss, but for fields of 300 or 400 gauss he finds the current is increased slightly by the presence of the field. He ascribes this effect to the electron placing itself so that its orbit is perpendicular to the field. The force of the field on it then being centrifugal, there is an increased tendency for ionisation to occur in the gas.

THE *British Journal of Photography* in its issue of May 5 directs attention to the numerous openings for improvements in optical apparatus as at present constructed, and advises manufacturers to employ experts to examine and improve their designs. As examples, it suggests the provision of two shallow saw-cuts at opposite ends of a diameter of each bezel ring used in a lens mount, so that by placing the edge of a steel rule in the cuts the ring can be easily removed. For lantern condensers the fine threaded screw method of mounting should be given up and replaced by the bayonet catch, or, better, by a stiff spring ring inside the mount holding the front lens against a loosely fitting separating ring, which in turn holds the back lens against a flange on the inside of the mount at the lantern end. Holes should be provided in the mount to allow any condensed moisture to get away. The condenser should be mounted in a cradle, which will allow of its insertion and removal when the lantern is in use without its being necessary to remove the lamp and withdraw the condenser through the body of the lantern, as is so often the case.

PROF. E. W. MARCHANT read an interesting paper on "Some Transient Phenomena in Electrical Supply Systems" to the Institution of Electrical Engineers on May 24. The experiments were made with the help of an oscillograph at the electrical station and substations of the Liverpool Corporation. Prof. Marchant investigated the "current-rushes" on switching transformers into the circuit. The results obtained bear out the conclusions which Prof. Fleming arrived at in the experiments he carried out twenty-five years ago at the Deptford power-station of the London Electric Supply Corporation, which was the first high-tension supply station in the world. Prof. Fleming's apparatus was, naturally, more primitive, but with the help of vacuum tubes and improvised electrical stethoscopes he detected all the main phenomena. We were specially interested in Prof. Marchant's oscillograms, showing the rush of current which ensues when an induction motor is switched into a circuit, as they prove that, although the initial rush of current may be the same whether the machines be carefully synchronised or not at the moment of switching in, yet the current diminishes to its steady value much more rapidly in the former case. The latter part of the paper on the current-surges which occur when putting alternators in parallel, and the transient currents which ensue on switching on and off high-tension cables, although containing little that is novel, gives excellent illustrations of the substantial accuracy of the ordinary differential equations used by engineers.

OUR ASTRONOMICAL COLUMN.

EARLY HISTORY OF THE SOLAR SYSTEM.—An important contribution to the mathematical investigation of the evolution of the solar system has been made by Dr. Harold Jeffreys in a communication to the Royal Astronomical Society (Monthly Notices, vol. lxxviii., p. 424). It is first shown to be improbable that the planets were formed by the gradual condensation of a gaseous mass, and it would seem that they were strongly condensed from the beginning, and were formed catastrophically. The tidal theory is therefore adopted, according to which a star of mass several times greater than that of the sun approached it so closely that the tidal action resulted in the extrusion of one or two streams of matter having a considerable velocity. These streams would break up almost at once into a series of fluid masses, and the gaseous matter set free in the initial disruption would form a resisting medium, the effect of which would be to reduce the eccentricities of the original orbits. From the rate of change of eccentricity it is provisionally estimated that the age of the solar system is 3×10^9 years, which is in general agreement with the age derived by radio-active methods. Among other results of interest it is shown that all the bodies having diameters less than 1000 km., if assumed to be composed of silica, must have been liquid or solid from the beginning, as smaller masses could not have been held together by their own gravitation when in the gaseous state. Dr. Jeffreys considers that the asteroids were probably formed from a primitive planet which approached Jupiter so closely as to be broken up by tidal action.

STELLAR INVESTIGATIONS AT MOUNT WILSON.—In the *Journal des Observateurs*, vol. ii., No. 6, Mr. W. S. Adams gives a brief account of the more general stellar investigations which have recently been carried on at Mount Wilson Observatory. Following an explanation of the spectroscopic method of determining stellar parallaxes, it is stated that the method has now been applied to more than a thousand stars, and that the precision of the results appears to be of the same order as that of parallaxes measured directly. In regard to stellar motions, space velocity appears to be mainly a function of absolute magnitude, the fainter stars moving more rapidly than the brighter, probably to some extent on account of difference in mass, the less massive stars having the greater velocities. A recomputation of the constants of the solar motion gives the position of the sun's apex as R.A. 270·9°, decl. +29·2°, and velocity 21·48 km. The investigations of stream motion furnish considerable support to the view that the stars show a motion of revolution around the centre of the galaxy, and that